

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

No claims are being amended.

Claims 1-24, 30, 37 and 40-49 remain pending in this application, of which claims 1-24 are withdrawn from consideration.

Rejections under 35 U.S.C. § 103

Claims 30, 37, 40, 41, 43, 45, 46 and 48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0782880 to Noda et al. ("Noda") in view of U.S. Patent No. 5,593,647 to Kirby ("Kirby"). Claims 42 and 47 were rejected under 35 U.S.C. § 103(a) as obvious over Noda in view of Kirby, and further in view of U.S. Patent No. 5,057,483 to Wan ("Wan"). Claims 44 and 49 were rejected under 35 U.S.C. § 103(a) as being obvious over Noda in view of Kirby, and further in view of U.S. Patent No. 5,152,231 to Patil et al. ("Patil"). Applicants respectfully traverse these rejections for at least the following reasons.

Independent claim 30 recites as follows:

A catalytic converter comprising:

a carrier; and

a layered structure disposed on the carrier, the layered structure

including:

a hydrocarbon (HC) trap layer trapping HC, said HC trap layer being disposed on the carrier; and

a multilayered catalyst system disposed on the HC trap layer, said multilayered catalyst system comprising *a first catalyst layer disposed on the HC trap layer and a second catalyst layer disposed on the first catalyst layer disposed on the HC trap layer*, the first and second catalyst layers forming a dual-layered catalyst system that is disposed on the HC trap layer such that HC released from the HC trap layer is purified by both the first and second catalyst layers, said first and second catalyst layers comprising catalyst noble metals, respectively, said catalyst noble metal present in the second catalyst layer being controlled to be active earlier than the catalyst noble metal present in the first catalyst layer,

wherein the first catalyst layer comprises a first washcoat, and the second catalyst layer comprises a second washcoat, an amount of said second washcoat present in the second catalyst layer based on a unit volume of the

carrier being smaller than an amount of the first washcoat present in the first catalyst layer based on the unit volume of the carrier.

Thus, in the catalytic converter of claim 30, a first catalyst layer is disposed on the HC trap layer, a second catalyst layer is disposed on the first catalyst layer disposed on the HC trap layer, the first and second catalyst layers comprise first and second washcoats, respectively, and the amount of the second washcoat present (based on a unit volume of the carrier) is smaller than an amount of the first washcoat present (based on the unit volume of the carrier). The references applied fail to either disclose or suggest this feature of claim 30, or appreciate the advantages of such structure in increasing the HC conversion efficiency in by allowing that HC released in the underlying HC trap layer can be quickly oxidized and reduced during the engine warm-up operation.

The relation between the amount of the washcoat present in the outer catalyst layer and the amount of the washcoat present in the inner catalyst layer in the Noda structure is precisely the opposite to that as recited in claim 30. In particular, Noda indicates in the Examples cited in the Office Action, Examples 14, 16, 17, 20, 83, 88, 93, 98, that the amount of the washcoat present in the outer catalyst layer is larger than the amount of the washcoat present in the inner catalyst layer underlying the outer catalyst layer. For instance, in Example 14, the amount of the washcoat present in the “Third layer” (outer catalyst layer) is 0.09, while the amount of the washcoat present in the “Second layer” (inner catalyst layer) is 0.06.

Moreover, Noda fails to recognize the effect of the relation between the amount of washcoat in the first (inner) and second (outer) catalyst layers on increasing the HC conversion efficiency by allowing that the HC released in the underlying HC trap layer is quickly oxidized and reduced. In particular, due to the amount of the second washcoat present in the second catalyst layer being smaller than the amount of the first washcoat present in the first catalyst layer, the heat capacity of the second catalyst layer (the outer catalyst layer) is reduced. This reduction in heat capacity for the second catalyst layer results in a quick temperature rise at the second catalyst layer during the catalyst activation period. Therefore, when the HC begins to be released from the HC trap layer, the first catalyst layer

can be activated earlier so that the released HC can be quickly oxidized and reduced during the engine warm-up operation. Thus, the catalytic converter as recited in claim 30 allows for an increased HC conversion efficiency. Noda does not contemplate increasing the HC conversion efficiency by having the washcoat amount in the outer catalyst be smaller than that in the inner catalyst.

Kirby fails to cure the deficiencies of Noda, in that Kirby does not suggest that the relationship between the amount of washcoat in a first (inner) and second (outer) catalyst layers increases the HC conversion efficiency by allowing the HC released in the underlying HC trap layer to be quickly oxidized and reduced. Kirby merely discloses in column 3, line 53 to column 4, line 2 that the amounts of the washcoats on the inner and outer catalyst layers are controlled in view of the purification characteristics for the exhaust components HC, CO and NOx. Nowhere does Kirby disclose or suggest that the amounts of the washcoats on the inner and outer catalyst layers exert such significant influence on heat capacity of the respective catalyst layers to thereby allow quick oxidization of the HC released from an underlying the HC trap layer. In fact, Kirby does not disclose a structure with an HC trap layer, followed by first and second catalyst layers disposed thereon.

The structure of catalytic converter of claim 30 contemplates obtaining not only the desired exhaust purification characteristics but also an increased HC conversion efficiency of HC from an underlying HC trap layer by taking into account the influence of the amounts of the two washcoats present in the two catalyst layers on heat capacity of the respective catalyst layers. That is, the structure of catalytic converter of claim 30 contemplates increasing the HC conversion efficiency by controlling the amounts of the two washcoats present in the respective catalyst layers on a HC trap layer which significantly influences the heat capacity of the respective catalyst layers for allowing the HC released from the HC trap layer to be quickly oxidized. Neither Noda nor Kirby suggests this effect, and claim 30 is not obvious thereover.

Independent claim 37 recites “said multilayered catalyst system comprising a first catalyst layer disposed on the HC trap layer and a second catalyst layer disposed on the first catalyst layer disposed on the HC trap layer” and “wherein the first catalyst layer comprises a

first washcoat, and the second catalyst layer comprises a second washcoat, an amount of said second washcoat present in the second catalyst layer based on a unit volume of the carrier being smaller than an amount of the first washcoat present in the first catalyst layer based on the unit volume of the carrier” and is thus patentable for reasons analogous to claim 30.

The dependent claims under consideration ultimately depend from either claim 30 or 37 and are therefore allowable for at least the reasons discussed above with respect to the independent claims.

Wan and Patil were cited for other features of the claims, but fail to cure the deficiencies of Noda and Kirby and analogous arguments apply.

Double Patenting

Claims 30, 37 and 40-49 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,503,862 (“’862 patent”) in view of EP 918 145 to Ishii et al. (“Ishii”), U.S. Patent No. 4,975,406 to Frestad et al. (“Frestad”) and Kirby. Without conceding the propriety of the above double patenting rejection, and in order to further prosecution, a Terminal Disclaimer with respect to the ‘862 patent is being filed herewith under 37 C.F.R. 1.321(c). Accordingly, applicants respectfully submit that the obvious-type double patenting rejection has been overcome and respectfully request that the rejection of claims 30, 37 and 40-49 be withdrawn.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED REGARDING THIS APPLICATION UNDER 37 C.F.R. §§ 1.16-1.17, OR CREDIT ANY OVERPAYMENT, TO DEPOSIT ACCOUNT NO. 19-0741. SHOULD NO PROPER PAYMENT BE ENCLOSED HERewith, AS BY A CHECK BEING IN THE WRONG AMOUNT, UNSIGNED, POST-DATED, OTHERWISE IMPROPER OR INFORMAL OR EVEN ENTIRELY MISSING, THE COMMISSIONER IS AUTHORIZED TO CHARGE THE UNPAID AMOUNT TO DEPOSIT ACCOUNT NO. 19-0741. IF ANY EXTENSIONS OF TIME ARE NEEDED FOR TIMELY ACCEPTANCE OF PAPERS SUBMITTED HERewith, APPLICANTS HEREBY PETITION FOR SUCH EXTENSION UNDER 37 C.F.R. § 1.136 AND AUTHORIZE PAYMENT OF ANY SUCH EXTENSIONS FEES TO DEPOSIT ACCOUNT NO. 19-0741.